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Letters from Carlos Ibáñez e Ibáñez de Ibero to Aimé Laussedat: new sources for the history of nineteenth century geodesy

Received: 9 November 2005 / Accepted: 9 June 2006 / Published online: 11 July 2006
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Abstract Recently found letters written by Carlos Ibáñez e Ibáñez de Ibero (1825–1891), first president of the International Geodetic Association, to geodesist–photogrammetrist Aimé Laussedat (1819–1907) are discussed. The contents of these epistolary conversations reflect their personal pre-occupation with solving the geodetic problems of the time (1857–1889) and their desire to develop and propagate geodetic knowledge across all international boundaries.

Keywords History of geodesy · Carlos Ibáñez · Aimé Laussedat · Private correspondence

1 Introduction

Historians of geodesy and its pioneering international organizations may be interested in knowing about the recently discovered collection of letters from General Carlos Ibáñez e Ibáñez de Ibero (1825–1891), first president of the International Geodetic Association, to Colonel Aimé Laussedat (1819–1907), a member of the French Academy of Sciences. Laussedat unified the then seemingly disparate fields of photography and surveying, hence better known today for his seminal investigations on terrestrial photogrammetry, initially termed phototopography and later known as photographic surveying (Deville 1895; Talley and Robbins 1945). Their

story supplements the annals of the nineteenth-century geodetic revolution fermented by scientists of the calibre of Johann Jacob Baeyer (1794–1885) and Friedrich Robert Helmert (1843–1917), whose influence was decisive in fostering an experimental era that preceded and gave solid foundation to the theoretical and practical achievements of modern geodesy (Torge 2005).

Before Laussedat's scientific interests totally moved toward the applications of the art of photography to surveying and mapping, he was a renowned astronomer–geodesist with a significant list of publications in his curriculum (see Doležal 1909). August Chauveau (1827–1917) in his eulogy delivered to the members of the French Academy of Sciences on the occasion of Laussedat's death said: "He always profited from his solid knowledge of geodesy that he never stopped to increase and improve" (Chauveau 1907). Among Laussedat's prolific production, one in particular reached the category of contemporary bestseller representing the canonical text on photographic surveying for many years. This popular treatise (Laussedat 1898–1903) coalesced from a set of serial articles that periodically appeared in the journal *Annales du Conservatoire des Arts et Métiers*.

Although Laussedat is frequently credited with the appellation "father of photogrammetry" our priority here mainly centres on his early work on geodesy and related mathematical sciences and, specifically, to the surviving correspondence that Carlos Ibáñez sent him commenting on some geodetic enterprises that marked the prelude of higher geodesy. In passing, it should be mentioned that the field of early photogrammetry has also appealed to recognizable number of theoretical geodesists that diverted the main focus of their expertise to investigate specific photogrammetric problems (e.g. Hotine 1930).

A reader interested in reviewing the life and work of Carlos Ibáñez e Ibáñez de Ibero, one of our protagonists, should refer to the profile by Soler (1997) that includes a detailed bibliography of his most notable scientific output. It is important to summarize that Carlos Ibáñez held a number of important positions in several worldwide organizations that spearheaded geodesy and metrology during difficult times

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Fig. 1 Gen. Carlos Ibáñez e Ibáñez de Ibero [Oil-on-canvas painting by Víctor Moya Calvo, 1953. *Galería de Catalanes Ilustres*, Barcelona; reprinted with permission]

crisscrossed by European wars, financial shortages, and international instability. Ibáñez was the founder and the first director of the *Instituto Geográfico* (1870–1890) located in Madrid, later renamed *Instituto Geográfico y Estadístico*; president of the Permanent Commission of the *Europäische Gradmessung* (1874–1887); president of the Permanent Committee of the International Commission of the Mètre (1872–1891); first president of the International Committee for Weights and Measures (1874–1891); and, finally, first president of the International Geodetic Association (1887–1891). Ibáñez has been the subject of numerous recent studies that emphasized diverse aspects of his scientific career (e.g. Martínez-Utesa 1995; Sevilla de Lerma 1999; Ruíz-Morales 2003; Núñez de las Cuevas 2005; Torge 2005).

No less important were the accolades bestowed on Laussedat by his contemporaries: Professor of astronomy and geodesy *École Polytechnique*, Paris (1856–1871); Commissioner for the Franco-German boundary (1871–1873); Professor of geometry at the *Conservatoire des Arts et Métiers* (1873–1879); Director of Studies of the *École Polytechnique* (1880–1881); Director *Conservatoire des Arts et Métiers* (1881–1900); he was Grand Cross of the Legion of Honor (*Légion d'Honneur*); colonel in the Engineer Corps until his retirement in 1879; member of the French Academy of Sciences (1894–1907); member of the *Bureau des Longitudes* (1858–1863); president of the Council of the Paris



Fig. 2 Col. Aimé Laussedat [Photograph published in *Can Alpine J* 1(2), 1908; copyright expired]

Observatory (1903–1907); and president of the *Société Française de Photographie* (1903–1905).

Posthumously, in 1911, Canada recognized Laussedat's achievements in photographic surveying by naming a peak in the Rocky Mountains after him. This acknowledgment came about after the Topographical Survey of Canada, led by its Surveyor General Édouard Deville, successfully implemented a refinement of Laussedat's methodology to establish the Alaskan frontier with the US. In 1960, a series of elevations extending 8 miles in the Antarctic continent were christened with his name. Further information about Laussedat's life and achievements is available in Mariani (1901), Violle (1906), Carnot (1907), Anon. (1907), Tisserand (1911) and Bruel (1936). Significantly more emotive is the short remembrance written by another one of his dear friends that touches upon little-known family situations (Deville 1908).

2 The letters

The epistolary discussions, subject of this article, are embedded in a framework that intertwines technical concerns, personal issues and politics, but, above all, show a caring friendship between the two intellectuals and the great mutual

respect that each one held for his counterpart in the scientific accumulation of knowledge.

The letters from Ibáñez to Laussedat were discovered by Ruíz-Morales (2005b) among other personal papers stored in the municipal archives of the town of Moulins (Allier), birthplace of the French scholar, and for the first time they came to public attention in a recent publication (Ruíz-Morales 2005a). This unexpected finding sheds a new light not only on the professional activities of these two prominent geodesists, but also about some private opinions of interest for understanding the world of international geodesy through the years of their correspondence. Ibáñez penned all his letters in perfect French and in a scrupulous handwriting. The collection was translated into Spanish by Ruíz-Morales (2005b) and contains a total of 49 letters spanning more than three decades from 1857 to 1889. Unfortunately, the replies that Laussedat sent back to Ibáñez appear to have been lost and, to date, no trace of them has been reported.

This disappearance may be explained by the various changes of residence that Ibáñez underwent during the time that this exchange took place but, most importantly, the fact that Ibáñez spent the last 2 years of his life living in a precarious condition in Nice, France, where he voluntarily exiled himself from Spain. On December 20, 1889, Ibáñez was granted 1 year leave (later extended to two) from his post as General Director of the *Instituto Geográfico y Estadístico*; a decision prompted by his discontent about a newly enacted bureaucratic policy that abolished the genuine autonomy of the Institute as a singular general direction. He died after a short illness on 28 January 1891, isolated from the recognition and moral support of the Spanish government, who embarrassed/offended his family and acquaintances by not sending any official representation from Madrid to his funeral.

The apparent friendship between Laussedat and Ibáñez perhaps started in 1856. That year Ibáñez was in Paris performing the calibration of the so-called “Spanish Rod” designed by Ibáñez and Jean Brunner (1804–1862) and fabricated by Brunner’s shop at the time considered one of the best manufactures of geodetic instruments. According to Ibáñez (1884, p. 119), Laussedat was one of the scientists involved in the determination of the dilatation coefficients of this bimetallic optical apparatus later to be used for the measurement of the central base of the Spanish first-order geodetic triangulation. Located in Madrdejos (province of Toledo) about 100 km south of Madrid this geodetic baseline, the first surveyed in Spain, had a length of $14,662.896 \pm 0.004$ m (Ibáñez 1884).

2.1 Decade of 1850 (14 letters)

In 1857, while Ibáñez was preparing the logistics concerning the measurement of the Spanish baseline, he unexpectedly received notice through his superior and mentor General Zarco del Valle (1785–1866), the then president of the Spanish Academy of Sciences, of Laussedat’s intention to visit Spain. Laussedat, then a professor of geodesy at the *École*

Polytechnique in Paris, was sent to Spain by the French War Department in conjunction with the French Academy of Sciences to observe the novel field procedures planned by Ibáñez and his collaborators during the scheduled measurement of the Madrdejos baseline.

Ibáñez immediately wrote to the Frenchman (first letter) in order to let him know of his current postal address in Barcelona. In the second letter dated February 1858, Ibáñez announced the beginning of May 1858 as the date to start the measurement, speculating that it would take about 5 months to conclude. Ibáñez confided his wishes of seeing Laussedat in Spain, writing, “desiring fervently that your current occupations will not be an obstacle” to make the trip. The following letter, already written from Madrdejos, remarked that “the preparations are going faster than expected and excluding unforeseen impediments the operation could be completed by October.” The text implies that Laussedat postponed his arrival to Madrdejos to the end of August 1858. In the same letter, Ibáñez admitted that all personnel were camping about 8 km from the baseline and inquired about the exact date of Laussedat’s arrival in Madrid in order to arrange for one of his colleagues to be present to welcome him.

In the very next letter, Ibáñez changed his mind and tells Laussedat that he himself will wait for him in Madrid. It is unclear when Laussedat arrived in Spain and how many days he spent in Madrdejos. The Memoirs of the Spanish Geographical Institute mention Laussedat’s participation in the baseline measurement on 24 August 1858 (Ibáñez 1884, p. 156). Undoubtedly, the decisive camaraderie established between Ibáñez and Laussedat during this period was going to be very important for the scientific development of both geodesists. According to the letters, Ibáñez completely relied on his friend to review the results of the Madrdejos baseline. In fact, Ibáñez provided Laussedat with all measurement results before they were published. With this information, the French geodesist prepared the final report of his trip, while he simultaneously proceeded to translate into French the thorough and pivotal work done in Madrdejos.

In the following letters, Ibáñez continued to inform Laussedat of the progress of the operation concentrating on the angular measurements devised to prove that baselines of about 2 km could be extended without significant deterioration to lengths of 14 km, strongly supporting the convenience of reducing the tedious direct measurement of geodetic baselines to 3 km. As Ibáñez commented in the letter of 29 March 1859, all angular measurements were finalized using a Repsold theodolite acquired by his organization and not the original instrument specifically designed for the job that Brunner was supposed to construct in Paris but never did. The results of this investigation were published in Ibáñez (1863).

In the same letter, Ibáñez mentioned an interesting anecdote. He sent Laussedat some pictures of the base camp at Madrdejos. Unfortunately, no record of these photographs is available at the Spanish Geographical Institute, or anywhere in Spain, although they may be unknowingly stored somewhere in France because copies of a second set were also sent

to Brunner. Although many engravings of the baseline measurements are available and have been published (e.g. Jordan 1890, p.95; Schuman and Kühnen 1897), these could be the only photographs ever taken showing the geodetic installations particularly devised to measure geodetic baselines as they were done almost one century and a half ago.

Also in 1859, Laussedat reported to the French Academy of Sciences the results obtained at Madrideojos (Laussedat 1859a). A translation of this memoir into Spanish, rarely included among Laussedat's bibliography, was published in the leading Spanish scientific journal of the time (Laussedat 1859b). These two works followed the publication by Ibáñez and his colleagues of an extensive treatise meticulously recapitulating the procedures used at Madrideojos and the final results (Ibáñez and Saavedra 1859). Following Ibáñez's suggestions, this compendium was promptly translated into French by Laussedat (1860). The rest of the letters of 1859 dealt with the angular measurements of the baseline, and often concentrate on the particulars of the French translations of the work previously mentioned. Incidentally, Laussedat's translation was very well received in Europe and, due to the universality of the French language in those days, this version predominates over Ibáñez's among the scientific collections of many worldwide libraries.

2.2 The decade of 1860 (30 letters)

There is a significant lapse of about 2 years until December 1861, when Ibáñez mentioned his marriage and invited Mr. and Mrs. Laussedat to visit his new home, commenting "now I am settled in Madrid, exempted from the obligation of spending eight months of the year walking through mountains." Ibáñez married for a second time in 1878. Paladini-Cuadrado (1991) and Martínez-Utesa (1995, pp. 220–226) describe the bizarre events surrounding the reappearance of his first wife, after the General's death, legally claiming her widow's pension and the – never clarified – accusations of bigamy that ensued.

In the aforementioned letter of December 1861, Ibáñez recognized the important activities of his friend in the field of terrestrial photogrammetry and recommended that one of his colleagues interested in this emerging technique visit Laussedat while in Paris. Ibáñez also mentioned that, if Laussedat so desired, he would be ready to introduce Laussedat's theories and phototopographic instrument to the Spanish scientific community: "If someday you want me to talk about your instrument in Spain, let me know and send me the pertinent information to write an article describing it."

At this point, some letters from Ibáñez to Laussedat are probably lost. In June 1862, Ibáñez complained that an important letter encouraging Laussedat to participate in the annual prize competition sponsored by the Spanish Academy of Sciences was not answered. Ibáñez was referring to the Academy's international contest opened to all scientists willing to submit a proposal solving the following query: "Determination of the probable errors resulting on the topographic planes as deduced from two photographic perspectives with consid-

eration of all generating possible causes." This title plainly shows the great interest by the Spanish elite scientific circles of the day on the evolution of phototopographic methods and the exact understanding of their precision and accuracy.

By the text of the letter, one can extrapolate that Laussedat mentioned to Ibáñez that he already had written a memoir with a topic similar to the Academy's proposal. He was probably referring to the ideas presented in his work with an almost identical title (Laussedat 1854) that was later extracted in Laussedat (1859c). The letter dated 29 June 1862, provides supporting evidence that some correspondence from Ibáñez to Laussedat may be definitely missing. Ibáñez concluded this short letter with the sentence: "Since yesterday I wrote you a long letter, today I do not have more news to report." However, the epistolary archive does not contain any letter written after 16 June.

On 10 July 1862, Ibáñez revisited the theme of the Spanish Academy's competition, cautioning Laussedat about the importance of not disclosing to anybody his intention to enter the contest. The winner of this competition was selected anonymously and their identification revealed only after opening a sealed envelope. In the last two letters of 1862, Ibáñez congratulated his friend for the decision to work hard in the preparation of the memoir, encouraging him to send the work, well-packed through any of the private couriers working between Paris and Madrid.

He did not recommend using diplomatic mail, emphasizing: "I believe that you should not consider sending your memoir through the embassy if you do not want to lose it" and continued "I am impatient to receive it, first to read it, and then, to start its translation into Spanish. I am sure that you are not serious when you mention that it may not be worth it. I am convinced of its value and my only concern is that you may not have treated the theory at length [. . .] I am as interested in this issue as if it was mine [. . .]. You, I believe, know my character well, consequently, you must know the great satisfaction that I will have translating your memoir. Although I am busy during the day, I am the sole owner of the evenings which I can dedicate to your work with the hope that it can achieve further recognition here."

On March 28, 1863, Ibáñez wrote: "It's been a few days already, that your memoir was translated and copied. I plan to review it in the coming holidays (probably referring to Holy Week) and send it to the Academy with your name and address in a sealed envelope. The person presenting your proposal to the Secretary of the Academy will be given a receipt that I will guard vigilantly."

On 18 April 1863, an anonymous proposal was submitted to the Academy competition with the following esoteric identifying motto: "*Per varios usus artem experientia fecit (Manilius). Sit modus in rebus*". Nobody – except Ibáñez – knew, at the time, that the name of Laussedat was intrinsically attached to these concealed passwords. This cryptic idiomatic aphorism was made up of two sentences. The first one was extracted from an astrological poem titled *Astronomica* (I:61), dating from the first century A.D., written by the Latin poet Marcus Manilius (ca. 10 B.C.–ca. 30 A.D.) which

when translated reads: Skill is achieved through the practice of various exercises. The translation of the second sentence reads: There is a middle ground to everything. It was possibly added by Laussedat to indicate his unpretentious objective while confronting his candidacy for the award.

In essence, the selection of this particular quotation points to the originality and intellectual capacity of a scientist who participated in a broad spectrum of creative discussions, which were not merely related to scientific disciplines. Laussedat was a prolific author who was not only concerned with technical issues. Until his death, he was a regular contributor to the journal *l'Intermédiaire des chercheurs et curieux* that dealt with literature, history, science, artisanry and curiosities. In 2006, the journal still exists and its monthly circulation in France has not abated since then. Conceivably, due to Laussedat's extroverted scientific personality, he was quoted by Jules Verne (1828–1905) in his book *From the Earth to the Moon* (Verne 1865).

The meeting of the Spanish Academy of Sciences held on 29 January 1864, disclosed that only one candidate had submitted an application for the award. However, Laussedat did not get the coveted grand prize on the first ballot – seven votes in favour, eight against. Instead, after a second vote was tallied, he received the consolation prize, which was the Gold Medal of the Spanish Academy of Sciences. If one compares the handwritten submission to the prize with Ibáñez's own calligraphy, it is possible to speculate that some of the members of the jury suspected that Ibáñez was involved in this affair – perhaps supported by undisclosed accomplices – and decided to vote against granting Laussedat the first prize. We can also conjecture that some members of the jury were aware of the memoir previously written by Laussedat (1854) and attributed a certain lack of innovation in his presentation for the prize. For the record, one should note that in the second ballot, Laussedat only received one negative vote among fifteen.

The proposal submitted by Laussedat was accompanied by the map of the village of Le Buc, near Versailles, France, plotted on a 1:1,000 scale, together with eight photographic views (which were unfortunately lost) on which the topography of this map was based. Paradoxically, in a footnote published by Laussedat in his treatise about instruments and methods (Laussedat 1898–1903, vol. 2, p. 144) in which he discussed the Le Buc project, he mentioned receiving copies of the photographs from the Secretary of the Spanish Academy of Sciences disclosing that the originals archived in Versailles had been lost. He proudly wrote “*ce travail a value à son auteur une médaille d'or*” [“this work has earned the author a gold medal”].

Ibáñez's handwritten translation of Laussedat's proposal remains archived at the Spanish Academy of Sciences and was recently reproduced in Ruíz-Morales (2005b). The possibility of Laussedat's award-winning memoir being published in Spain by the Spanish Academy of Sciences was mentioned in the letters between them. However, in a missive that Ibáñez wrote in May 1864, he admitted that according to the rules of the Academy, it was impossible to publish his translation

because the work was going to appear in French. Laussedat had already sent practically the same work to the *Mémorial de l'officier du génie*, where it was printed the same year (Laussedat 1864a). Ibáñez writes: “[. . .] the French language is so familiar to us, that a literal translation into Spanish would be valueless”.

It is interesting to note that 140 years ago, a translation of a previously published work in an international scientific language such as French was not considered sufficiently meritorious to be reproduced in Spanish. This attitude is not surprising; nowadays exactly the same premise applies to English, the predominant discourse of the scientific world. It is noteworthy that Laussedat's proposal was constructively commented on 50 years later in a synopsis presented to the scientific community by a future member of the Spanish Academy of Sciences who was noted for developing a solid vocation on photogrammetric research (Torroja y Miret 1911, Sect. I).

In the letter dated July 1864, Ibáñez praises his friend for the method he devised to determine meteorite orbits (Laussedat 1864b). In Ibáñez's own words: “this methodology is sufficiently precise to be used by people without sophisticated observational hardware desiring to reach expeditious results.” In the same script, Ibáñez states: “I consider you to be one of my best friends.” In September 1864, Ibáñez wrote a short letter regretting the inability of seeing him on the last trip he made to Paris accompanied by his wife “because it would have been a pleasure to give you a friendly handshake.” Then he notified Laussedat that he left the gold medal awarded by the Spanish Academy of Sciences in the custody of the Brunners for him to personally collect at his discretion after returning from the summer vacation.

In a letter dated 18 November 1864, Ibáñez mentioned his new appointment as Chief of the Geodetic and Topographic Surveys of the Balearic Islands, Spain. He reasoned that the climatic change might be helpful for the wellbeing of his wife, who despised the cold Madrid. The letter alludes to other geodetic matters. The first is on the mailing to Laussedat of a copy of Ibáñez's recently published monograph “Study on geodetic levelling”, which was immediately successful and was re-printed on several occasions (Ibáñez 1864). At the time, this study was cited by a plethora of geodesists (e.g. Sadebeck 1881; Pattenhausen 1882; Helmert 1884, p. 590). Finally, Ibáñez mentioned that in January 1865, he planned to spend 15 days in Paris determining the dilatation coefficients of his new baseline apparatus – later termed the “Ibáñez Rod” – at the Brunners shop. In actuality, this trip did not occur until March 1865 (Ibáñez 1969).

The Hispanic sense of humor of Ibáñez is manifested in a letter written in January 1865, where – with unambiguous irony – he told Laussedat of the peculiar Christmas gift he has masterminded for him that year: “the translation into French of the second volume of the measurement of the Madrideo base” (Ibáñez et al. 1859), which was reprinted in Laussedat (1865). This volume contains an Appendix (no. 10, pp. ccxiii–ccl) titled “*Publications relatives aux travaux géodésiques exécutés dans différent pays*” [“A bibliography

of geodetic projects performed in different countries”] citing all the important works on geodesy that had been published to that point. This list of papers, covering over 37 pages, possibly represents the earliest international bibliography exclusively devoted to geodesy.

On 14 March 1865, Ibáñez wrote a short note from the Hotel Bergère in Paris, where he was staying while determining the dilatation coefficients of his rod, telling Laussedat that he was very busy but, nevertheless, suggested an appointment to meet him within the next 2 days. They probably saw each other once more during this time period, although there is not any hard evidence that they actually met.

The next letter dated December 1865 was written in the Balearic Islands where, according to Ibáñez, “during two horrible months a cholera epidemic had ravaged the population.” After updating the tragedy that befell the Island, he takes up a geodetic topic, namely reporting the conclusion of the island’s first-order triangulation of 30 vertices. He related that a geodetic baseline was measured using his rod and that the reconnaissance of the second-order triangulation was also completed.

The following letter (dated May 1866) written from Mallorca is more interesting in content. First, Ibáñez congratulated Laussedat for the note he submitted to the French Academy of Sciences about the baseline measurements (Laussedat 1866). He then commented about Laussedat’s intention to join him in the geodetic work of the junction of the Balearic Islands with the eastern coast of Spain. Ibáñez explained the difficulties of this proposal: “I need the official authorization of our General Director and I doubt very much that he will concede considering that this prerogative is outside the usual international diplomatic channels.” He then argued that if the measurements had comprised the regions of Spain and France, with observers from both countries, the situation would have been very different. He recalled the expedition by Jean-Baptist Biot (1774–1862) and Dominique François Jean Arago (1786–1853), assisted by Spanish scientists, that extended the continental triangulation from Dunkerque to Formentera, a town in the Balearic Islands (Biot and Arago 1821). A similar situation was heralded in 1879 when Ibáñez, representing Spain, and François Perrier (1835–1888), representing France, accomplished the geodetic and astronomic junction between Europe and Africa.

One month after writing the previous letter, a new communication by Ibáñez mentions that his request to the Director General for granting permission to the French scientist to be present at the geodetic connection of Spain with the islands was answered negatively. Indeed, the nature of international collaboration has not changed much by today’s standards, where bureaucratic requirements to participate in multinational observation campaigns are generally cumbersome and processed at such a slow pace which at times create needless frustration.

Unexpectedly, in a letter mailed about 1 month later (12 June 1866), Ibáñez explained to Laussedat that due to the lack of monetary resources, the work to link geodetically the mainland with the islands was definitely suspended. Nevertheless,

Ibáñez continued directing the geodetic triangulations of the Balearic Archipelago, but in another letter written in December 1867, he bitterly complained about the final impossibility of joining Spain with the islands: “The deplorable state of our finances have impeded me to connect the islands to the continent using large triangles.” In the letter that follows, Ibáñez could not be more explicit: “You are absolutely right in desiring better days for me because, at present, they are not very good.”

This pessimism was going to drastically change months later. Soon after writing the above words, Ibáñez was considered to be the ideal person for his next mission and became involved with his duties of serving as the Spanish representative on the Permanent Committee of the International Commission of the Mètre, receiving several assignments to travel throughout Europe. Somehow, he seemed unaffected by his busy schedule and sporadically continued communicating with his friend Laussedat inquiring – as always – about his health and that of his family.

In August 1869, Ibáñez informed Laussedat about his imminent trip to Southampton, England, to calibrate his baseline apparatus against the English and other international standards. The results of these experiments were reported by Clarke (1873). In the same letter, Ibáñez said that he expected to see Laussedat at the meeting of the Permanent Commission of the *Europäische Gradmessung* in Florence, since Adolphe Hirsch (1830–1901) – Director of the Neuchâtel Observatory, and later secretary of the International Geodetic Association – had said that Laussedat might be able to attend.

Later, from Florence, Ibáñez replied to a letter from Laussedat telling him that he was very occupied with the activities of the Commission and laments not being able to see him at the meeting, particularly after learning that Laussedat was personally invited by Gen. Baeyer “[. . .] who was counting on your participation. Unfortunately, we have been precluded from your presence that for us, as well as for Mr. Hirsch, would have been a pleasure to enjoy.” He then goes on to geodetic science, informing him that “the Permanent Commission wrote a letter to the French War Department to pledge France’s participation in the Commission affairs as previously promised by the French Government; a promise that is overdue because, to date, they have not named any delegate/s to represent France [. . .]” He continues to say: “There is also the question of the metre, hence we are asking France to unite with other countries to select, by exploiting the scientific current capabilities, a scientific or, if you prefer, geodetic metre based on one prototype.” Ibáñez finished the letter by encouraging his friend to pursue the nomination for the two Commissions – Permanent and Mètre – with the following apparent harsh words that, nevertheless, corroborate the true friendship existing between the two: “And now, I do not wish to see any evidence of modesty or laziness on your part; do whatever you can to be nominated (to these positions) and in this way you could render a service to science and to your country that relating to these areas tends to be isolated.” However, Ibáñez’s visionary future for his colleague never materialized.

2.3 The decade of 1870 (3 letters)

From this point on, Ibáñez's national and international workload seems to have increased progressively. The next letter, dated June 1870, began with: "Finally I have a moment to write you a few words. You do not have any idea of the type of life I am leading, for me there are no holidays or any other rest except night time." Ibáñez then continues to inform Laussedat of his new appointment as Sub-director of Statistics that controls all geodetic and cadastral work, explaining: "I assure you that I am proud of this nomination, although I consider this job temporary since everything I could accomplish could be mercilessly erased at the next political reshuffle." Afterwards, he talked about the next project on his agenda, the precise geodetic levelling between Alicante and Madrid.

During the same month, Ibáñez replies to his friend excusing his lack of current contacts in England, which could have helped him during a pending visit to the Greenwich Observatory. He states: "[...] it has been almost 11 years that I do not visit the observatory [...] since the time that Mr. Airy so graciously welcomed me, a surprise, in fact, considering his character [sic]. With respect to the English instrument makers, I would not recommend them to you. You know that their instruments have imperfections, not encountered in other European instruments, with the exception of those of Mr. Casella, an excellent maker of meteorological instruments who always served me very well. I do not know if you ever visited the Southampton Centre. You will be well received by the Col. James and Capt. Clarke. Tomorrow I need to write to the latter and I will mention you in case you decide to stop by."

The communication is not reestablished until 19 February 1871, when Ibáñez immediately replied to a letter sent by Laussedat on Feb 9. Ibáñez probably wrote back so soon with the intention of convincing his comrade of not proceeding ahead with his intentions of retiring from the *École Polytechnique*. By the tone of the letter, with all certainty, Ibáñez was unaware that Laussedat had already secured the job of Commissioner for the Franco-German boundary. Ibáñez said "I think that you should not give up everything you have worked for so dearly for so many years [...]. If there is still time, and if you would like to listen to a friend, you should not abandon your idea but, instead, consider postponing it. Perhaps a later and calmer examination of things might convince you that there are no obstacles for you to continue serving your country. Please, reflect on this possibility." At the end of the letter, Ibáñez confides good news from his side: "Since the time I left you in Paris, my government created the *Instituto Geográfico*, a scientific establishment that brings together all geodetic, topographic and meteorological work. I am now the Director, and as result of this nomination, I have changed my address. Write [to] me again soon."

2.4 The decade of 1880 (the final 2 letters)

For unknown reasons, the exchange of letters stopped abruptly in February 1871, and no new contacts are documented until

July 1880. Based on the contents of this short letter, we infer that Ibáñez saw his friend Laussedat at several of the many meetings that the Spanish geodesist attended in Paris. This particular letter with the letterhead of the Geographical Institute simply says: "My dear friend, although I am still very tired, I did not want to let this day go by without giving you notice of my arrival to Madrid. It is true that my trip was very uncomfortable, but now I am very happy to let you know that my indisposition was a thing of the past. I send my affectionate regards to your wife while you receive those from your good friend, Ibáñez."

Nine years passed until we arrive at the last letter on record (21 December 1889). It was sent from Nice, the city where Ibáñez decided to settle after leaving Spain and where Henri Perrotin (1845–1904), Director of the Nice Observatory, welcomed him. Ibáñez's final letter was sad and pessimistic: "If at times you have thought about me, you are no doubt surprised by my long silence that I am finally breaking today, but not without difficulty, because it is very difficult for me to do so [...] I am still in the same administrative position as when I left Paris. My resignation has not been accepted, nor have I received the least official or private recognition." About a year later, Ibáñez died in Nice where his remains are still buried at the Chateau cemetery.

For many years, there has been interest in returning Ibáñez's remains to Spain. One of Ibáñez successors as General Director of the *Instituto Geográfico* said: "Gen. Ibáñez's ashes rest in Nice and it is our obligation to bring them to Spain" (Gómez-Núñez 1921). Recent attempts by the General Director in charge of the *Instituto* during 1974–1980 to procure the exhumation of Ibáñez's remains from Nice and lay them to rest at the *Panteón de Hombres Ilustres* in Madrid or another location in Spain (with the consent of the family) did not advance as expected (Núñez de las Cuevas 2005, private communication). Therefore, the issue of re-interring Carlos Ibáñez e Ibáñez de Ibero in Spain is not yet settled and may take many years to be resolved.

3 Conclusions

This article has briefly summarized the never-before discussed correspondence between two celebrated "personalities" of early international geodesy. Carlos Ibáñez's and Aimé Laussedat's lasting friendship was not affected by the uncomfortable frontiers of culture, language and distance. Their surviving epistolary conversations reflect the geodetic scientific interests of the time (late 1800s) and their desire to improve the teaching and research in the field to modestly contribute toward a presumed scientific globalization, where national collaborative efforts were united. In fact, the geodetic community of their time gave way to the creation of international scientific societies whose members were selected across national boundaries so as to benefit science in general and the advancement of geodesy in particular (Torge 2005).

Acknowledgements The authors wish to thank the collaboration of the Société Bourbonnaise des Etudes Locales and the City Hall of Moulins (France), as well as the Real Academia de Ciencias Exactas, Físicas y Naturales of Spain for providing access to their archives. Comments on the draft made by K-P Schwarz and two anonymous reviewers are greatly appreciated.

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